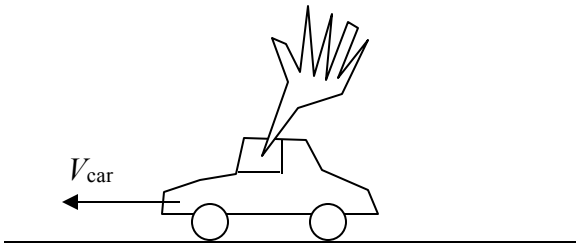
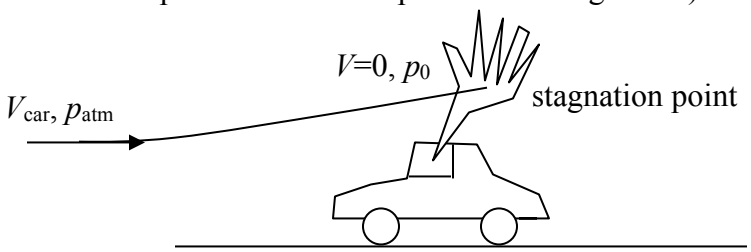
A person holds their hand out of a car window while driving through still air at a speed of V_{car}. What is the maximum pressure on the person's hand?



SOLUTION:

Change the frame of reference so that the car is stationary and the air approaches the car at a velocity, V_{car}. Apply Bernoulli's equation, neglecting elevation differences, along a streamline from a point far upstream of the car to the stagnation point on the person's hand (this will be the point at which the pressure is the greatest).



$$p_{atm} + \tfrac{1}{2}\rho V_{car}^2 = p_0 + \tfrac{1}{2}\rho \underbrace{V_0^2}_{=0}$$

$$\boxed{p_0 = p_{max} = p_{atm} + \tfrac{1}{2}\rho V_{car}^2} \qquad (1)$$